Space Weather Forecast

Issued on Monday 28 October 2024 at 13:15 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: S2 Moderate Solar Radiation Storm ongoing. Further M-class flares expected with chance of X-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with eleven sunspots on the disc and two Moderate flares observed, the strongest at 27/2324 UTC from the region in the northeast. This is a relatively small but complex region, that is now showing opposite magnetic polarities on its trailer spot. The central region of the cluster of sunspots in the southeast also has a this more complex configuration, and alongside the nearby regions also provides a notable flare risk. Although these nearby spots have shown a declining trend. The other regions are generally simpler or smaller.

No Earth-directed CMEs (coronal mass ejections) were observed.

Solar Wind / Geomagnetic Activity: The anticipated Strong flare CME, which left the Sun on 26 Oct, arrived at 18/0414 UTC. This was followed by solar winds speeds increasing from Slightly Elevated at 400km/s to be Elevated at near 600km/s. These winds then eased to around 500km/s by the end of the period. Interplanetary Magnetic Field (IMF) was initially Weak, then rose sharply to be Strong with the CME arrival, then eased to be Moderate at 10nT by the end of the period. The north-south component, was variable and weak for much of the period, but also became strong for a time with the CME arrival, but favoured a positive (northward) orientation. Geomagnetic activity was Quiet to Unsettled (Kp2-3) but became Active to G1 Minor Storm (Kp4-5) for a time with the CME arrival 28/0300-0900 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) persisted at the S2 Moderate Solar Radiation Storm level.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High activity is expected, with further Moderate class flares expected and a chance of isolated Strong class flares.

Solar Wind / Geomagnetic Activity: There are no further CME arrivals currently expected. Ongoing CME influence is forecast to ease day 1-2 (28-29 Oct). Solar winds are expected to easing from Elevated to Background, however some influence from the fast wind of a weak coronal hole may delay this until day 3 (30 Oct). Geomagnetic activity is forecast to be Quiet to Active at first

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with a chance of isolated G1 Minor Storm intervals, then easing to be mainly Quiet with isolated Unsettled intervals day 2 (29 Oct) onward.

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is expected to persist at S2 Moderate Radiation Storm level at first, only gradually declining through the period, and likely staying above S12 until at least later day 2 (30 Oct)

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	10	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	20	20	20	20

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	99	80	40	20
Very Active	≥ S3 *	No	5	5	5	5
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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